REMARKS

In view of the above amendments and the following remarks, reconsideration and further examination are requested.

Claims 1, 2, 4 and 5 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi (US 5,672,091) in view of Stephan (AU 245213) and Kanzawa (US 5,674,109).

Claim 1 has been amended so as to remove the limitation of the top ring having a universal joint. Further, new claims 7-21 have been added.

The above-mentioned rejection is respectfully traversed and is submitted to be inapplicable to the claims for the following reasons.

Claim 1 is patentable over the combination of Takahashi, Stephan, and Kanzawa, since claim 1 recites a polishing apparatus having, in part, a polishing table having a polishing surface with at least one notch formed in an outer peripheral portion of the polishing table, the at least one notch allowing light emitted from at least one optical measuring device to pass therethrough and be incident on a surface of a substrate and allowing light reflected from the surface of the substrate to pass therethrough and be incident on the at least one optical measuring device. The combination of Takahashi, Stephan and Kanzawa is respectfully submitted to be improper and therefore, the combination of Takahashi, Stephan and Kanzawa fails to disclose or suggest the above-mentioned feature recited in claim 1.

Takahashi discloses a polishing apparatus having an end point detection device. The polishing apparatus has a top ring 2 operable to hold a wafer F against a turntable 1 to polish a surface of the wafer F. The polishing apparatus also has a detection device including a beam emitter section 3 and a beam receiver section 4. The beam emitter section 3 and the beam receiver section 4 are positioned beyond an outer most edge of the turntable 1. When the wafer F being polished is to be checked to determine whether the polishing has been completed, the top ring 2 moves the wafer F laterally so that an edge portion of the polished surface of the wafer F overhangs the turntable 1 above the location of the beam emitter section 3 and the beam receiver section 4. (See column 3, lines 44-67 and Figure 1). It is apparent that Takahashi fails to disclose or suggest that the turntable 1 has at least one notch formed in an outer peripheral portion thereof.

In the combination, the Examiner relies on Stephan as disclosing at least one notch in a turntable. Stephan discloses a grinding disc 1 with a number of windows 2 and marginal slots 3 located therein. The positioning of the windows 2 and the marginal slots 3 is such that when the grinding disc 1 is rotated, an optical effect is created which results in an object on a side of the grinding disc 1 opposite to the viewer to appear to be completely visible. (See page 3, lines 6-25 and Figures 1 and 2). However, it would not have been obvious to combine the marginal slots 3 of Stephan with the turntable 1 of Takahashi.

As discussed above, Stephan discloses that it is the combination of the marginal slots 3 and the windows 2 which allows for the grinding disc 1 to produce the optical effect of seeing an object on the opposite side of the grinding disc 1 as a whole. Since the optical effect is the basis of the invention of Stephan, it is apparent that the marginal slots 3 and the windows 2 must be considered as a single entity because the combination of the two is required to produce the optical effect. Therefore, it would not have been obvious to combine just the marginal slots 3 with the turntable 1 of Takahashi.

Further, it would not have been obvious to combine the combination of the windows 2 and the marginal slots 3 of Stephan with the turntable 1 of Takahashi. As can be clearly seen from Figures 1 and 2 of Stephan, the addition of the windows 2 to the grinding disc 1 further reduces the surface area of the grinding disc 1 than would be the case if just the marginal slots 3 where present. However, as discussed above, the marginal slots 3 and the windows 2 are both necessary for the grinding disc 1 of Stephan to work properly. Therefore, this additional loss of surface area of the grinding disc 1 results in a lower polishing efficiency which, in turn, results in longer processing times of objects on the grinding disc 1 to achieve the same effect. As a result, it would not have been obvious to combine both the windows 2 and the marginal slots 3 of Stephan with the turntable 1 of Takahashi because it would unnecessarily result in a lower surface area of the turntable 1 which would increase the requisite amount of polishing time.

As for Kanzawa, it is relied upon in the rejection as disclosing a universal joint. However, Kanzawa also fails to disclose or suggest the above-discussed feature of claim 1. As a result, the combination of Takahashi, Stephan, and Kanzawa fails to disclose or suggest the present invention as recited in claim 1.

In addition to being patentable over the combination of Takahashi, Stephan and Kanzawa as discussed above with regard to claim 1, claim 4 is also patentable over the combination, since claim 4 recites that when the top ring is swung to a maximum, an area of the substrate which projects outward beyond an outer circumferential edge of the polishing table is not more than 40% of an entire area of the surface of the substrate being polished. The combination fails to disclose or suggest this feature as recited in claim 4.

In Takahashi, in order to determine whether the polishing of the wafer F is complete, it is necessary for the top ring 2 to move at least 50% of the wafer F off of the turntable 1. This is the case because the beam emitting section 3 and the beam receiver section 4 are beyond the outer edge of the turntable 1. (See Figure 1). Further, neither Stephan or Kanzawa discloses or suggests this feature of claim 4.

It is noted that the rejection of claim 4 indicates that the "not more than 40%" limitation is merely an obvious matter of design choice in the absence of a showing of criticality. However, the Examiner's attention is brought to paragraphs [0008] and [0038] of the substitute specification. Based on these two paragraphs, it is apparent that when a wafer is extended off of a turntable by 50% or more, a top ring with a universal joint would become inclined due to insufficient support by the turntable and would result in the wafer hitting against an outer peripheral edge of the turntable which could cause breaking or damaging of the wafer. As a result, the "not more than 40%" limitation is not merely a matter of design choice as suggested by the Examiner, since it will prevent such damage from occurring to the wafer. As a result, claim 4 is patentable over the combination of references.

As for new claims 7, 16, 19 and 21, they are patentable over the combination of references relied upon in the rejection for similar reasons as set forth above with regard to claim 1. That is, claims 7, 16, 19 and 21, similar to above claim 1, recite a polishing surface having a notch formed in an outer peripheral portion thereof, which feature is not disclosed or suggested by the combination of the references.

Because of the above mentioned distinctions, it is believed clear that claims 1, 2, 4, 5 and 7-21 are patentable over the combination of Takahashi, Stephan, and Kanahashi. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time of invention would not have been motivated to make any combination of the references of record in such

a manner as to result in, or otherwise render obvious, the present invention as recited in claims 1, 2, 4, 5 and 7-21. Therefore, it is submitted that claims 1, 2, 4, 5 and 7-21 are clearly allowable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that there are issues remaining which must be resolved before allowance of the application.

Respectfully submitted,

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